

Fig. 1: A clamp-on sensor

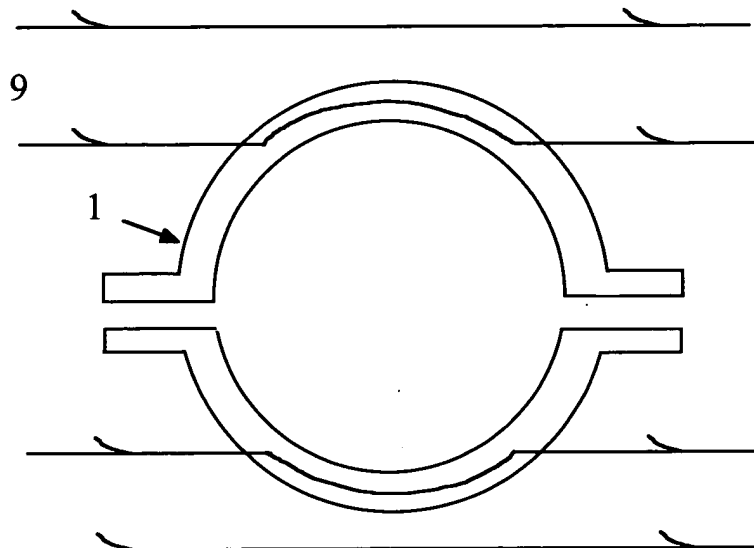


Fig. 2: Uniform magnetic field (H_u) 9 of the earth H_e acting on the core.

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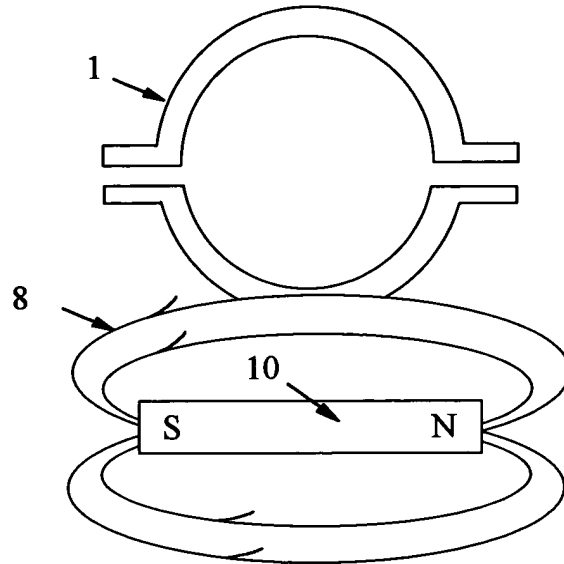


Fig. 3: A non-uniform magnetic field (H_n) 8 from a magnet acting on the core.

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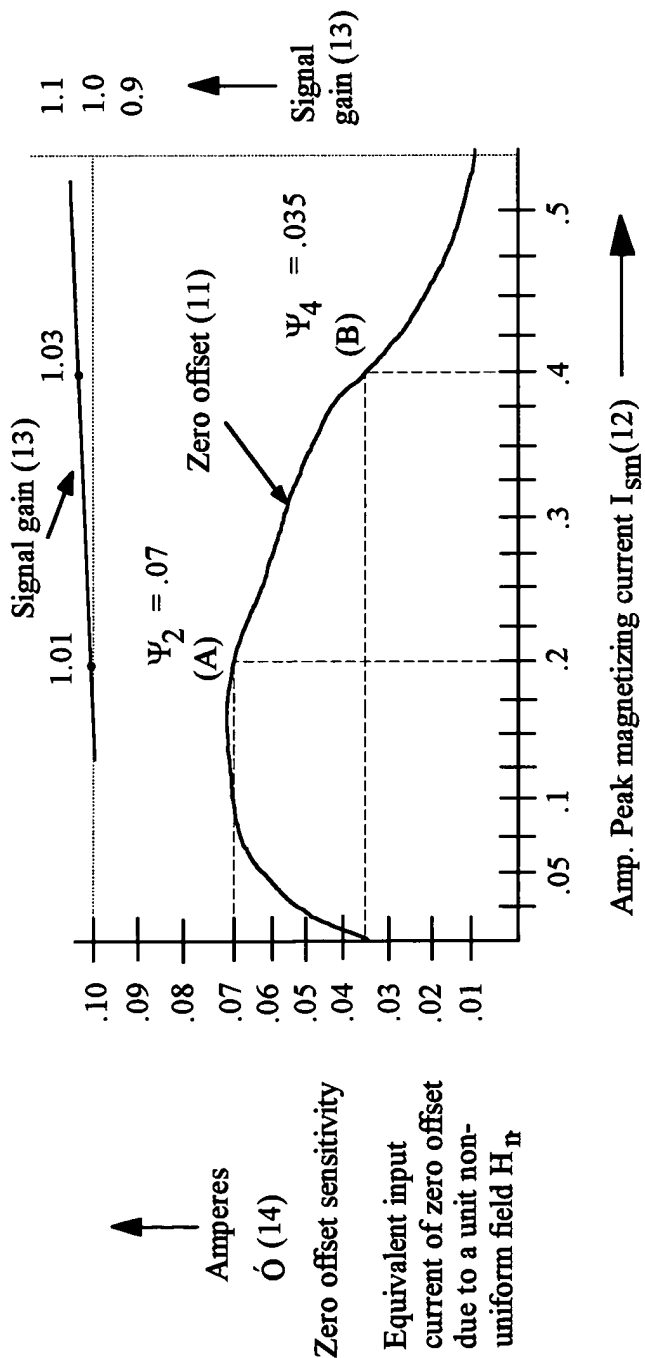


Fig. 4

Normalized Signal Gain (g) vs. I_{sm}
and
Normalized Zero Offset from H_n vs. I_{sm}
for
Five inch diameter aperture sensor #88.

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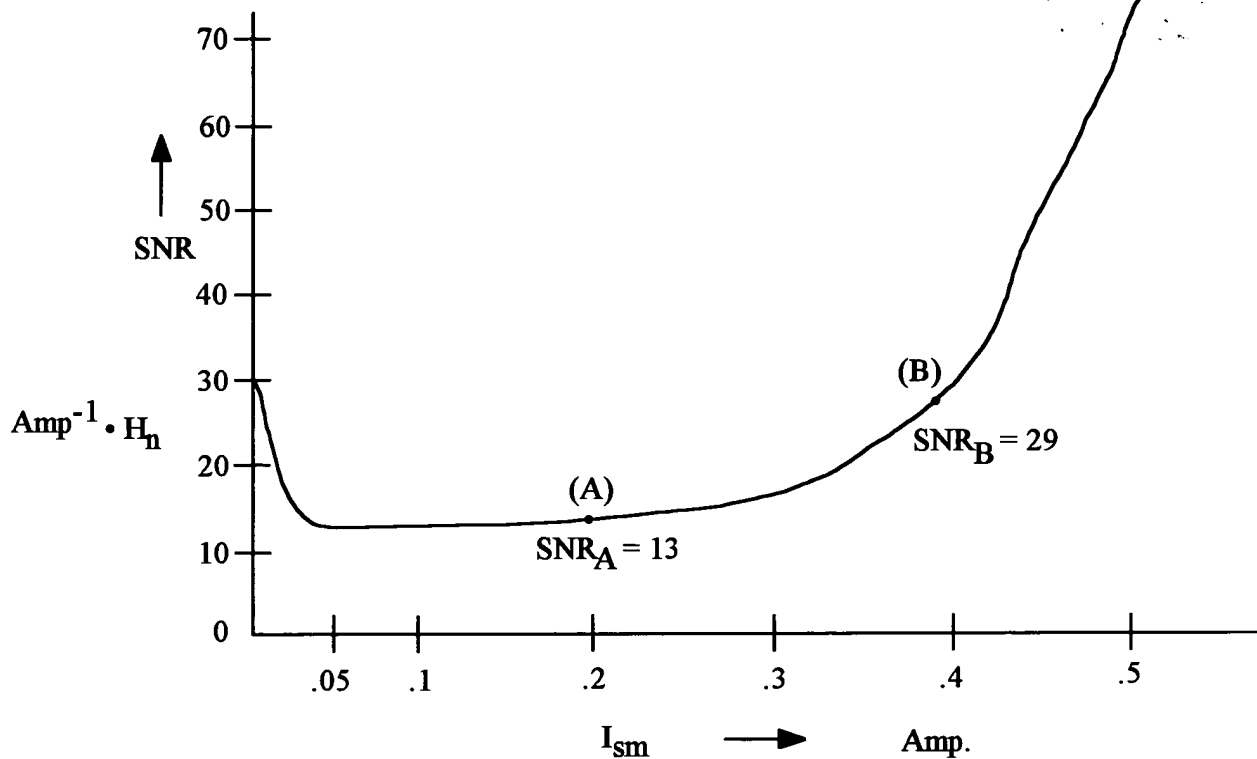


Figure 5
Signal to Noise Ratio (SNR) for Non-Uniform Field H_n
vs.
Operating Parameter I_{sm}
for
5" dia. aperture clip #88 in SN 2336

$$\begin{aligned}
 SNR &\equiv \frac{\frac{\delta V}{\delta I} \text{ (output)}}{\frac{\delta V}{\delta N} \text{ (input)}} \cdot \frac{\text{output}}{\text{noise}} \\
 &= \frac{\text{gain}}{\text{gain} \cdot \frac{\delta \dot{O}}{\delta N}} \cdot \frac{Z}{g} = \text{equivalent input offset } I \text{ per unit non-uniform field } H_n
 \end{aligned}$$

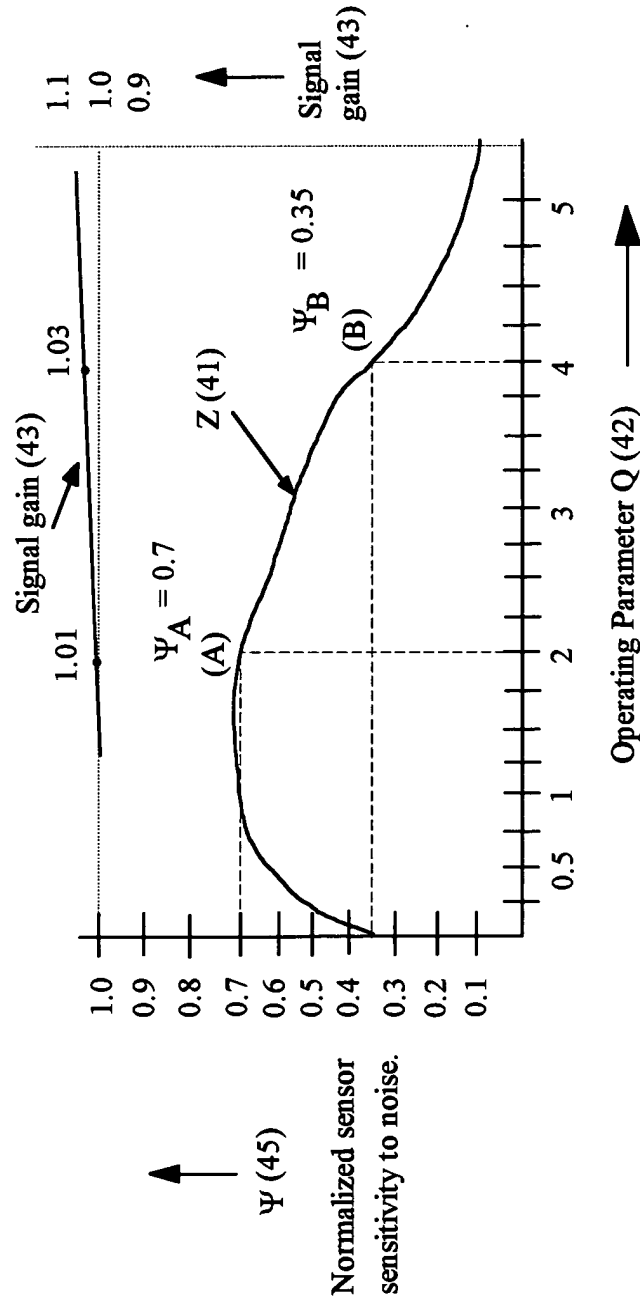


Fig. 6

Normalized Signal Gain vs. Operating Parameter Magnitude
and
Normalized Sensitivity to H_n vs. Operating Parameter Magnitude
for
A Hypothetical Sensor Presented as an Illustration.

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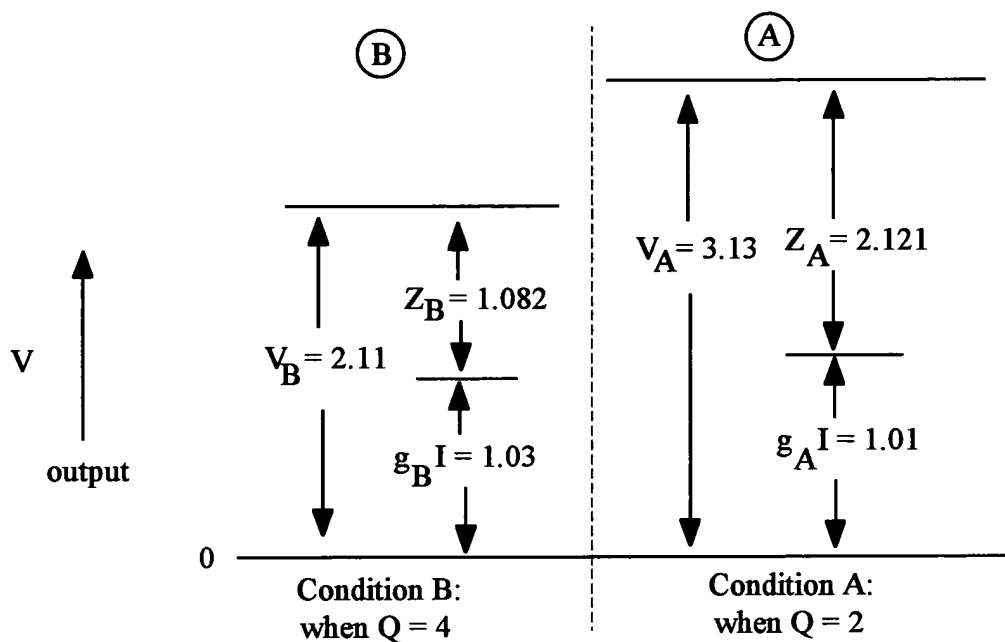


Fig. 7

The illustration displays typical relationships between error, gain, etc., before correction of a hypothetical sensor.

Variables:

$I = 1$

$N = 3$

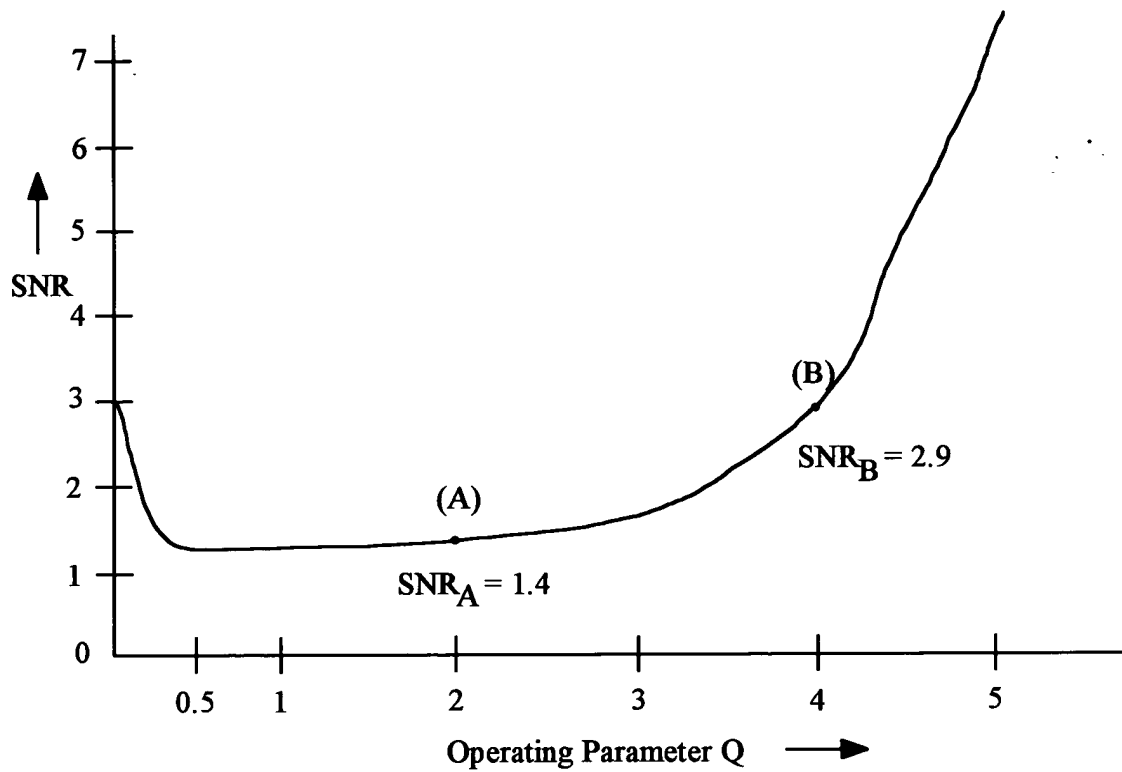


Figure 8
Signal to Noise Ratio (SNR)
vs.
Operating Parameter Q
for
A Hypothetical Sensor shown in Fig. 6

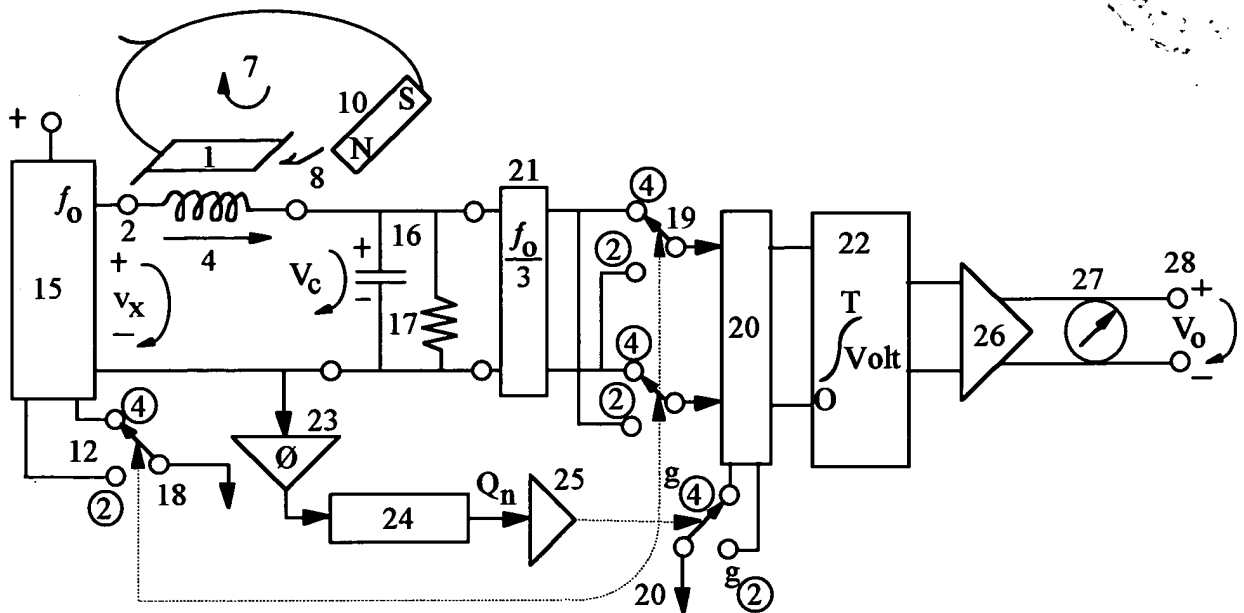


Fig. 9: A switching implementation of the mathematical relationship shown in Eq. i).

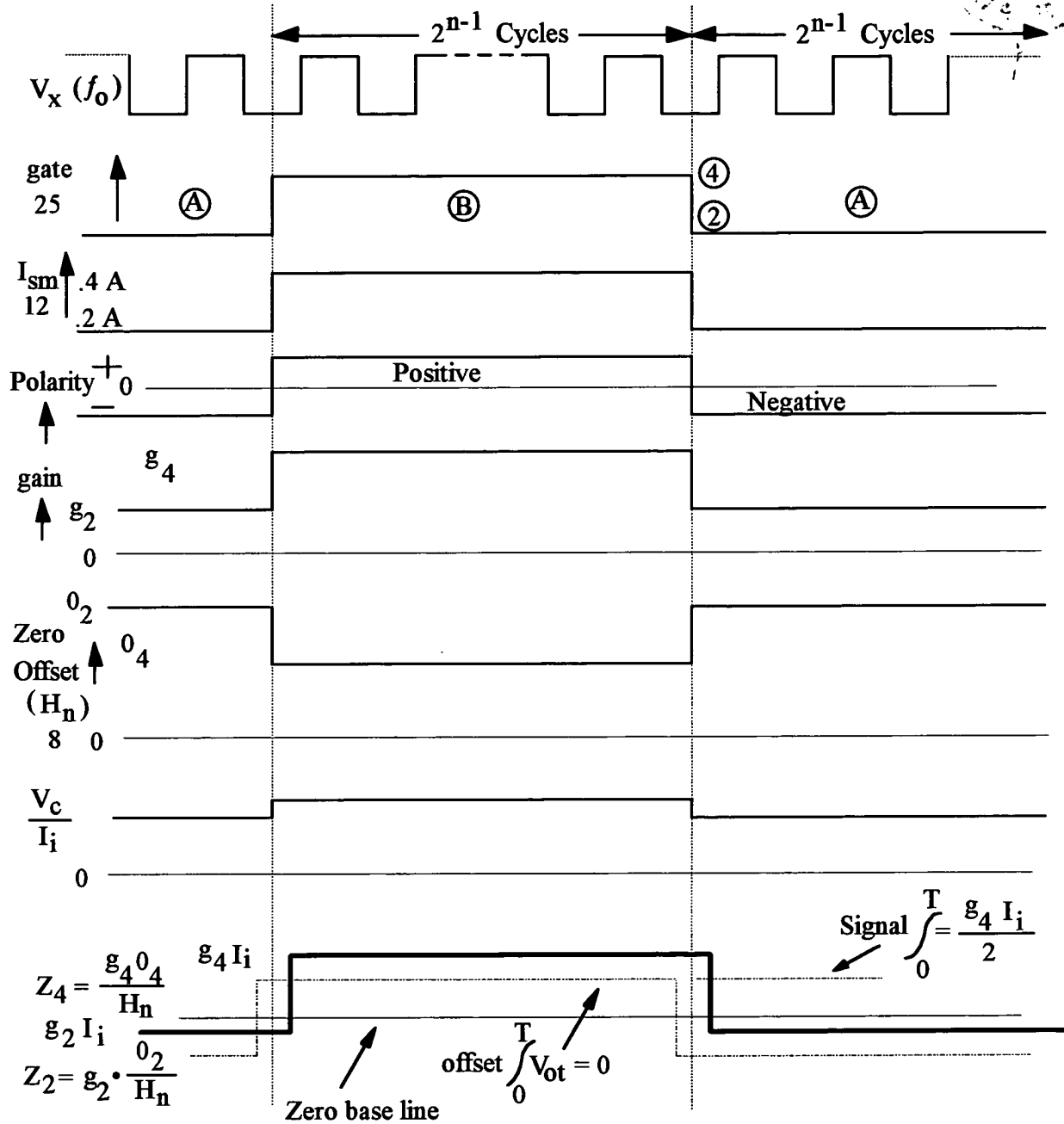


Fig. 10: Voltages in Fig. 9 shown as they change from time interval (A) to time interval (B).

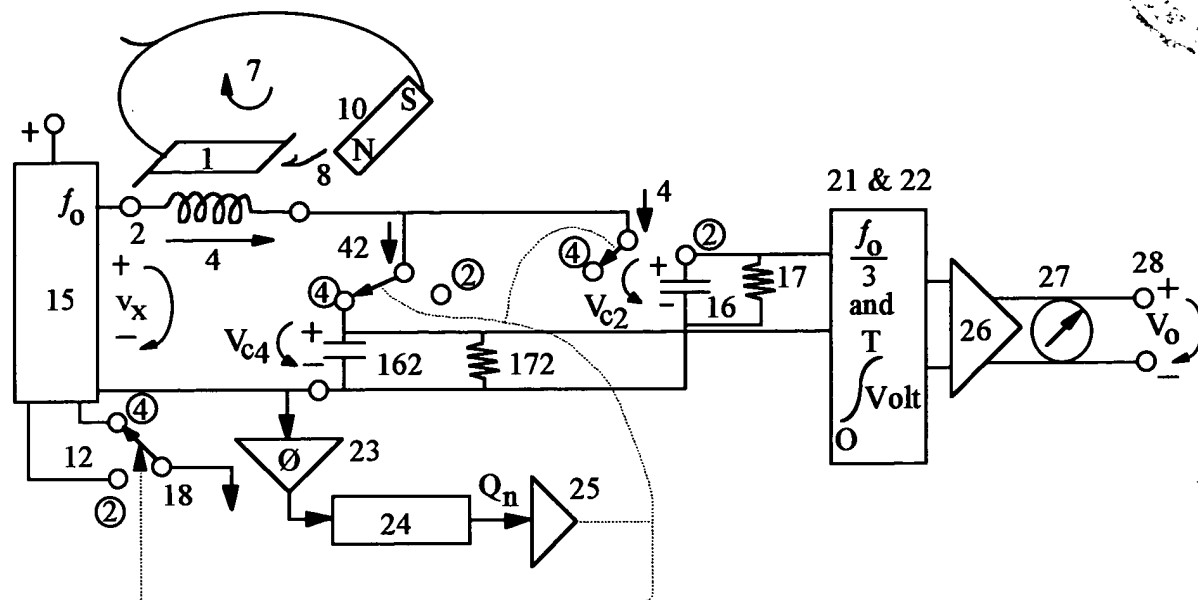


Fig. 11: A simpler implementation of the method defined in Eq. i).

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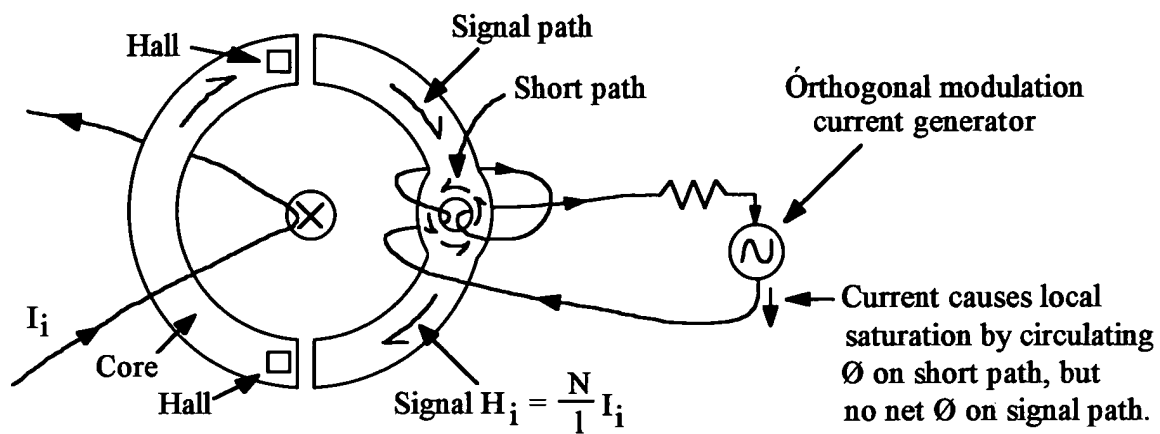


Fig. 12: Proposed core structure and magnetic reluctance selective modulation means for a Hall type clamp-on DC ammeter.

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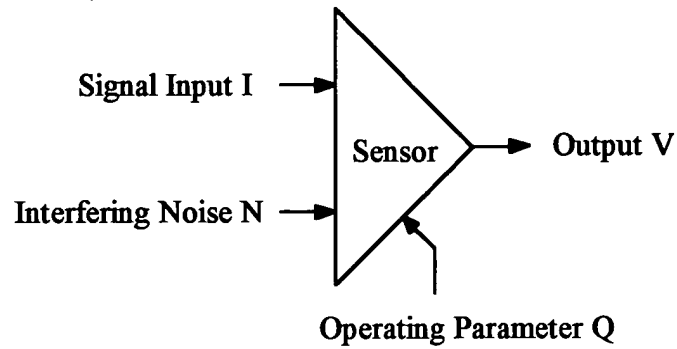


Fig. 13. General representation of a Sensor described in Eq. a) thru Eq. j).